

**In the Claims:**

Please cancel Claims 6-7, 14-15, 24-25, and 35-36 without prejudice.

Please amend Claims 1, 11, 12, 20, 26, 31 and 37 as follows.

- A2  
Sub B1
1. (Amended) A triple-junction solar cell comprising:  
a first cell layer comprising a germanium (Ge) substrate doped with an n-type dopant, wherein the n-type dopants in the germanium substrate includes phosphorus and arsenic;  
a nucleation layer disposed over the first cell layer;  
a second cell layer comprising gallium arsenide (GaAs) disposed over the nucleation layer; and  
a third fourth cell layer comprising indium gallium phosphide (InGaP) disposed over the second cell layer.

- A3  
Sub B1
11. (Amended) A triple-junction solar cell comprising:  
a dual-junction structure comprising a first junction and a second junction;  
a third junction having a p-type substrate, wherein the third junction doped with arsenic and phosphorus; and  
a nucleation layer disposed between the dual-junction structure and the third junction and comprising a material that shares a substantially similar lattice parameter with the p-type substrate of the third junction, wherein the nucleation layer serves to control the diffusion depth of the third junction.
12. (Amended) The triple-junction solar cell as recited in Claim 11 wherein the p-type substrate of the third junction is germanium (Ge) and the nucleation layer comprises indium gallium phosphide (InGaP).

20. (Amended) A method for controlling the diffusion of a dopant into a substrate during a subsequent device process during the fabrication of a multi-layer semiconductor structure, the method comprising:

- (a) disposing a nucleation layer over the substrate; and
- (b) performing the subsequent device process to form an overlying device layer containing the dopant, wherein the dopants include phosphorus and arsenic, wherein the nucleation layer serves as a diffusion barrier to the dopant in the overlying device layer such that diffusion of the dopant into the substrate is limited by increasing the thickness of the nucleation layer.

Sub  
B1  
A4

26. (Amended) The method as recited in Claim 20 wherein a two-step diffusion profile is achieved in an n-p junction formed in the substrate.

Sub  
B1  
A5

31. (Amended) A method for fabricating a multi-layer semiconductor structure, the method comprising:

- (a) preparing a germanium (Ge) substrate layer for doping by a dopant, wherein the dopants include phosphorus and arsenic;
- (b) disposing a nucleation layer over the germanium substrate layer;
- (c) disposing a middle layer comprising gallium arsenide (GaAs) over the nucleation layer; and
- (d) disposing a top layer comprising indium gallium phosphide (InGaP) over the middle layer, wherein the nucleation layer serves as a diffusion barrier such that diffusion of the dopant into the germanium substrate can be limited by increasing the thickness of the nucleation layer.

Sub  
B1  
A6

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(Amended) The method as recited in Claim 31 wherein a junction depth in the germanium substrate layer is substantially between 0.3  $\mu\text{m}$  and 0.7  $\mu\text{m}$  upon completion of said steps (a) through (g).